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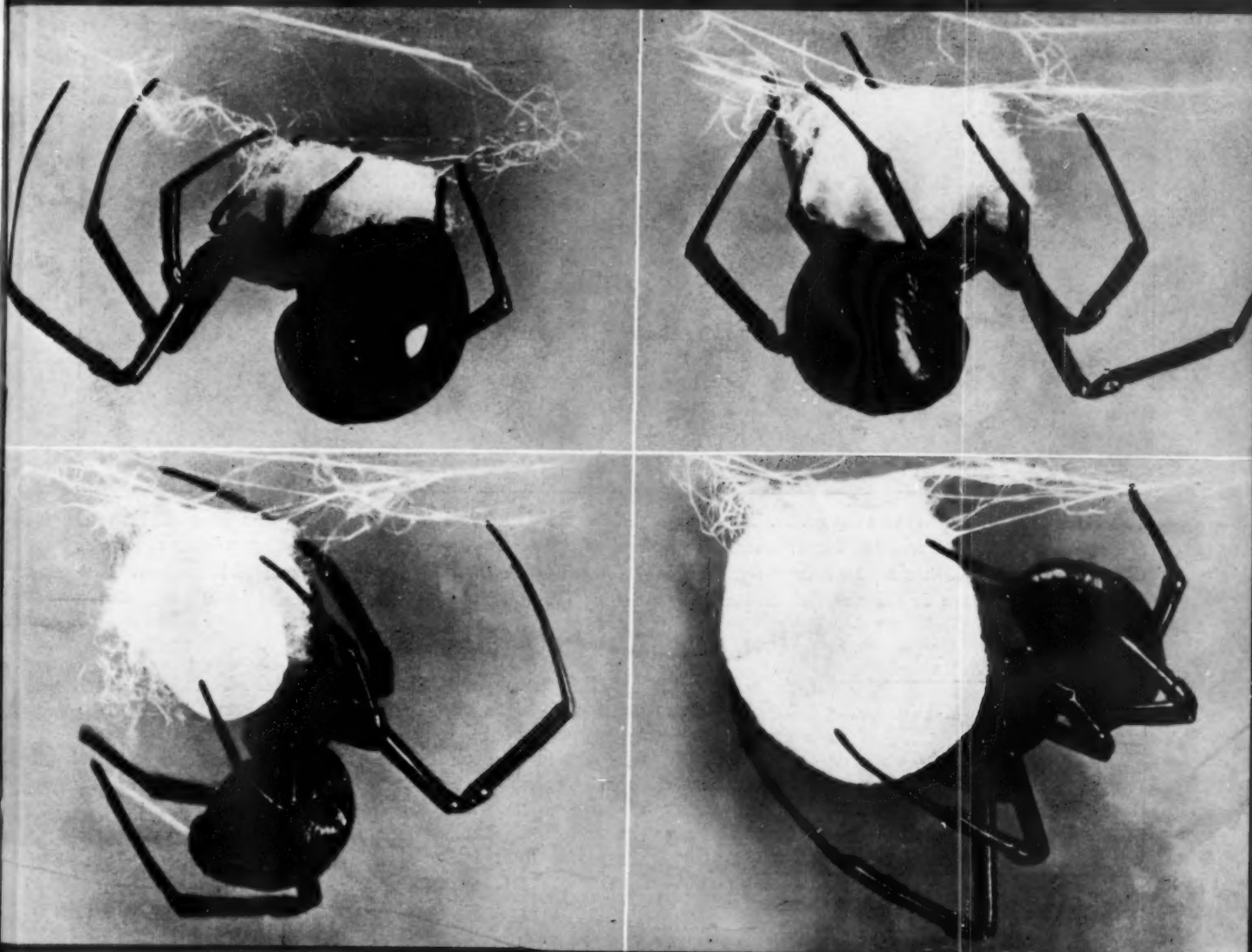
SCIENCE NEWS LETTER

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OCT 18 1947

DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE • OCTOBER 11, 1947



Widow

See Page 233

A SCIENCE SERVICE PUBLICATION



A CRYSTAL THAT GREW FROM A SEED . . . The large crystal in the foreground is an EDT (Ethylene Diamine Tartrate) crystal. It started from a seed (a piece of mother crystal) and in three months grew in a slowly cooling solution to the size shown. The small plate is cut from a large crystal, then gold-plated for electrical connection and mounted in vacuum. Cultivated EDT crystals can do the same job as quartz in separating the nearly 500 conversations carried by a coaxial circuit.

Crystals for Conversations

AT WAR'S END, the Bell System began to build many more Long Distance coaxial circuits. Hundreds of telephone calls can be carried by each of these because of electric wave filters, which guide each conversation along its assigned frequency channel. Key to these filters was their frequency-sensitive plates of quartz.

But there was not enough suitable quartz available to build all the filters needed. Bell Telephone Laboratories scientists met the emergency with

cultivated crystals. Years of research enabled them to write the prescription at once — a crystal which is grown in a laboratory, and which replaces quartz in these channel filters.

Now Western Electric, manufacturing unit of the Bell System, is growing crystals by the thousands. Many more Long Distance telephone circuits, in urgent demand, can be built, because the scientists of Bell Laboratories had studied the physics and chemistry of artificial crystals.



BELL TELEPHONE LABORATORIES

EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

BIOCHEMISTRY-PHYSICS

Atomic Debris Is Deadly

Products of atomic bomb and pile are dangerous radioactive agents which can fatally bombard the bone marrow where blood is made.

► THE DEBRIS from atomic bombs contains the world's most dangerous radioactive agents which can fatally bombard the body's bone marrow where blood is made.

This was discovered in a University of California research that had as its object finding what biological action can be expected from the elements born of atomic fission and of the atomic piles. (*American Journal of Radiology*, Sept.).

The findings are significant primarily for two reasons: 1. They have helped make the nation's atomic production plants and experimental laboratories among the safest there are; 2. They elaborated the implications of the possible biological action of atomic explosions or use of by-products of the atomic piles as a sort of atomic poison gas in warfare.

In a comprehensive report issued under the sponsorship of the Atomic Energy Commission and with acknowledgment to the Manhattan Engineer District, Dr. Joseph G. Hamilton, University of California medical physicist, describes animal research which has been in progress in Berkeley since 1942 on the metabolism of the fission products and the trans-uranic elements.

In a description of the scope of the problem which confronted scientists when they undertook to develop an atomic energy industry, Dr. Hamilton made a comparison with radium. He pointed out that since radium was discovered 50 years ago, one kilogram, or a thousand curies in terms of its radioactivity measurement, has been isolated.

During these 50 years a large number of instances of radium poisoning have occurred, Dr. Hamilton pointed out.

He added that the fission products alone produced in the Hanford atomic piles are in the range of millions of curies, and that kilogram quantities of plutonium have been isolated by complicated chemical processes involving many workers.

Since the trans-uranic elements and the fission products, including nearly 200 isotopes of 34 elements extending from zinc to europium, are with one or two exceptions strange to the human

body or undetectable if present, and consequently nothing was known about their biological effect in 1942, the magnitude of the problem was readily apparent.

Dr. Hamilton and his co-workers have studied the distribution, retention and excretion in the animal body of 20 of these radio-elements, and are continuing research on others.

Included are five elements which are synthetic products of the atomic ovens or of cyclotron bombardments, which are not found in nature. These are element 61, and the trans-uranic elements, plutonium, neptunium, americium and curium. So rare is curium in the world that its metabolism was studied with quantities too small to be visible to the naked eye; only in the last few weeks has a grain-sized quantity of this element been isolated in pure form in the Berkeley laboratories. (See *SNL*, Sept. 27).

The Berkeley scientists duplicated as nearly as possible the possible manner in which poisoning from the radio-elements might occur, through the mouth, nose and scratches or cuts in the skin.

Slices of bone or tissue were then placed on a photographic plate, the radiations from the deposited elements exposing the plate and giving a picture of the distribution of the materials.

Dr. Hamilton said the most significant finding was that many of the highly radioactive groups of elements studied are deposited in a thin layer of tissue, called the osteoid matrix, adjacent to the bone-marrow cavity.

The bone marrow manufactures red blood cells, and is extremely sensitive to radioactivity. Its bombardment by alpha particles emitted by some of the elements could interfere seriously with the multiplication of red blood cells and white corpuscles, the scientists found. Further, the body does not eliminate these elements readily, and they remain radioactive for a long time.

Plutonium, neptunium, americium, curium, and the naturally occurring element, thorium, are included in this group, as well as the fission products, yttrium, zirconium and cerium. Dr. Hamilton said it is probable that others



BODY PARTS LIBRARY—Disabled persons can now get the best artificial parts to fit their needs by visiting the Veterans Administration showroom or library in Washington. The exhibit includes many models of aids for the blind and deaf, artificial arms, legs, hands, eyes. The VA sells none of them, but explains the advantages of each manufacturer's model, making possible the best buy with the least amount of trouble.

would have a similar action in the bone, including the fission products, columbium, lanthanum, praseodymium, neodymium, element 61, samarium, europium; and the naturally occurring elements actinium and proactinium.

Some of the fission products are slightly less dangerous because they emit lighter beta particles, Dr. Hamilton said. But the actinide series, including plutonium, have the undesirable characteristics of radium in that they have both long half-lives and emit heavier alpha particles.

Dr. Hamilton said that radium is probably less dangerous for comparable amounts of radioactivity, than, for ex-

ample, plutonium. The reason is that radium is distributed throughout the mineral structure of the skeleton, with the result that fewer alpha particles penetrate to the marrow.

The research was done in collaboration with Dr. Robert S. Stone, professor of radiology in the University of California Medical School, formerly head of the plutonium project health organization, by Dorothy Axelrod, Josephine Crowley, Dr. Harvey Fisher, Henry Lanz, Kenneth G. Scott, Dr. L. Van Middlesworth, Dr. D. H. Copp, Dr. I. L. Chaikoff, Dr. D. M. Greenberg, Dr. Roy Overstreet, Dr. Louis Jacobson, and Dr. Hamilton.

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30-acre plot at the center of the sprayed area and in an unsprayed check area of the same size one-half mile away.

The five commonest bird species, making up more than three-quarters of the entire bird population, suffered an overall 65% loss in the sprayed area. Heaviest losses were to three species, Maryland yellow-throat, prairie warbler and mouse wren, which were cut down by 80% in the sprayed area. The towhee or ground robin suffered a 35% loss. Of the five most abundant species, only the yellow-breasted chat seemed unaffected.

Birds suffer DDT poisoning by eating poisoned insects, and especially by feeding them to their nestling young.

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ENGINEERING

300-Cycle Power for Lights

Would improve fluorescent lighting but must wait for development of frequency converters for homes and offices. Would increase efficiency.

► BETTER fluorescent lighting is obtained by the use of higher frequency currents, the Illuminating Engineering Society meeting in New Orleans was told by John H. Campbell of General Electric.

General application will await the development of frequency converters for homes and offices to change the present 60-cycle power into frequencies in the range of from 300 to 600 cycles. The converters will have to be efficient and low in initial cost if the advantages of the new system for operating fluorescent lamps are to be obtained.

The efficiency of light output can be increased about 25% by use of the higher frequency, he said, and the cost of the ballast reduced considerably. The so-called ballast is the choke coil used to control and stabilize the electric discharge in the tube of the fluorescent lamp. The decreased cost in the ballast is due to the fact that with the higher frequencies a ballast weighing only a few ounces can be used, compared with a ballast of several pounds used with the 60-cycle power.

Flashing Fluorescent Lamps

► FLASHING fluorescent lamps for street advertising were described at the same meeting by Fred J. Vorlander and Sigmund Stawicki of the Champion Lamp Works, Lynn, Mass. Scientists of this company are credited with develop-

ing the first commercially successful circuit for the so-called flashing hot-cathode fluorescent lamps. The cathodes are the electric terminals within the fluorescent tube between which the electrical energy passes to cause the light.

In the device described, the repeating flashes are due to a combination for continuously heating the cathodes with an instant start circuit. The instant start circuit, regularly interrupted mechanically or otherwise, provides sufficient current to start the lamps without aid of a starting switch. Cathode deterioration is minimized by the constant heating of the cathodes.

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ORNITHOLOGY

Test Spraying Shows DDT Harms Small Birds

► DDT is capable of great harm to small-bird life in young forest growth when sprayed to check insect pests, it appears from evidence presented before the meeting of the American Ornithological Union in Toronto by Chandler S. Robbins of the U. S. Fish and Wildlife Service.

An oil spray of DDT was applied at the rate of five pounds per acre to a 90-acre tract of five-year-old scrub and sapling growth at Beltsville, Md., just outside Washington, D. C. Afterwards, bird population studies were carried on in a

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ELECTRONICS

New Telephone Technique

By "PCM," brief samples of many conversations can be sent simultaneously at rate of 8,000 per second using pattern of pulses to prevent interference.

► BETTER communication by long-distance telephone is promised by a new technique which makes use of a new vacuum tube and what is known as pulse code modulation. The remarkably clear transmission which the new system affords was demonstrated by Bell Telephone Laboratory scientists to the New York section of the Institute of Radio Engineers.

The pulse code modulation technique, known as PCM for short, is entirely different from earlier forms of pulse modulation by means of which the voice is carried by short timed bursts of electrical energy on specific wavelengths. It promises marked freedom from noise and interference.

Pulse modulation is so named because the continuous speech wave is not transmitted. What is sent is what are called samples of the wave, bits of them taken at a rate of some 8,000 a second. These brief samples are enough to reconstruct the original wave at the receiving end with high fidelity.

Since the information regarding the samples can be sent very quickly, in roughly a millionth of a second, the system can carry many different conversations at the same time. It actually carries a sample from one conversation, then one from another and so forth, repeating the sampling cycle through as many conversations as are being transmitted. Each is reassembled at the receiving end by proper equipment.

PCM differs from other pulse modulation methods by using a set of patterns or codes, each one of which conveys specific information about the sample which it represents. Each of these patterns consists of an arrangement of electrical pulses which always contains a definite and constant number of pulses. These pulses are either "on" or "off", that is, either present or absent. The more code patterns there are available, the better the voice wave may be reconstructed. Experiments show that patterns or code-groups using six or seven pulses are satisfactory.

The new vacuum tube is responsible for the coding. It looks like a ten-inch

radio tube, but within it is a special plate perforated in appropriate order for the various codes to be used. The plate is so placed that a beam of electrons can sweep across the seven elements of any one code-group, giving an "on" pulse when it goes through the holes, and an "off" pulse when it is blocked.

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MEDICINE

Streptomycin May Conquer Epidemic Infant Diarrhea

► STREPTOMYCIN may become the conqueror of epidemic infant diarrhea, the scourge of maternity hospital nurseries which gained nation-wide attention when it attacked babies on Army "bride ships."

At least four babies stricken with this disease are alive today because of streptomycin, in the opinion of Maj. Irvin J. Cohen, the Army medical officer under whom some of the bride ship babies were treated.

The mold chemical, disease-fighting ally of penicillin, was used in treatment of 13 cases of infant diarrhea, Maj. Edwin J. Pulaski and Col. William H. Amspacher, of the Army Medical Center at Fort Sam Houston, report in the *New England Medical Journal* (Sept. 18). Eight of the infants were from an Army bride ship. The first seven, because of lack of experience with the mold remedy in this disease were given small doses. Two of these died as a result of severe toxemia and involvement of the brain and central nervous system. The others were sent home from the hospital in good condition and on full diets between the fifteenth and thirtieth days after admission to the hospital.

One baby girl who had facial paralysis and convulsion was in a state of collapse and almost dead when the streptomycin treatment was started. Within 12 days she was well enough to be taken home, having gained one pound five ounces, and with only a mild facial palsy left from her severe illness.



FOR CLEARER CALLS—This is the new PCM tube with which it is possible to transmit many long distance conversations simultaneously without interference.

The number of babies treated is too small to warrant any conclusions, the Army medical officers state. But when a proper routine and dosage for using streptomycin has been worked out they believe deaths from epidemic infant diarrhea will definitely be reduced. The remedy seems to shorten the period of illness, control starvation and malnutrition and reduce the time the babies must stay in the hospital.

Further studies of the remedy for this disease are urged.

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ORNITHOLOGY

Bird Protection Results In Increase of Waterfowl

► BIRD protection in the Netherlands has resulted in the increase of many species, Prof. G. J. van Oordt of the University of Utrecht told the British Association for the Advancement of Science. Notable among these are eider-ducks, gulls, Sandwich terns and cormorants. A few species, however, have suffered from the competition set up by increase in other birds' numbers, among them the common tern and the sheldrake.

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Pure white sugar contains no vitamins or minerals.

PUBLIC HEALTH

TB Vaccination Debated

One authority believes it may act as smoke screen to hide germs, and defeat action of chemical weapons. Another just as strongly in favor of vaccines.

➤ BCG AND OTHER anti-tuberculosis vaccines will defeat efforts to wipe out the white plague and block the chances of streptomycin or other chemical conquest of it, one noted tuberculosis authority, Dr. J. Arthur Myers of the University of Minnesota Medical School, declared before the American Public Health Association meeting in Atlantic City.

Vaccination was equally strongly recommended as one of four measures for fighting TB in a report at the same session by another distinguished TB fighter, Dr. F. M. Pottenger of the Pottenger Sanatorium and Clinic for Diseases of the Chest, Monrovia, Calif.

Vaccines against tuberculosis would act as smoke screens, hiding the TB germs, Dr. Myers declared. They sensitize the body tissues to the protein of the germ, he explained. This makes useless the best of anti-TB weapons, the tuberculin test, because this test detects the presence of the germs in the patient's body through the sensitization they have set up.

Every case of tuberculosis can be diagnosed by this test within seven weeks after the germs have invaded the body. At this period X-rays and all other methods of examination fail in 90% to 95% of the cases. Yet it is at this time and for a few months thereafter that streptomycin may have its greatest usefulness as a remedy for the disease.

TB-fighting without vaccines has been so successful in Minnesota that authorities there now speak of eradication of the disease, Dr. Myers said. Among children in the 277 schools of a four-county sanatorium district tuberculosis infection has decreased from 14% in 1930 to 2.5% in 1947. In 219 of these schools, no child reacts to tuberculin, meaning no child has been infected by the germs of tuberculosis. Only five to eight per 100 of senior high school students in several counties have been infected. In the state's largest city, with a population of 500,000, the germs attack less than one out of each 100 of the population (0.33%) each year. Of 100 babies born, it is three years before one is infected with TB germs.

Vaccination was urged by Dr. Pottenger to protect children and others who are in contact with the "cured" patient who still scatters occasional, or "rare," tuberculosis germs.

The number of such germs may amount to a few hundreds or thousands daily from a single patient, contrasted with the hundreds of millions and even billions of TB germs expectorated daily by a patient with acute tuberculosis. Counts of the daily TB germ output by patients in various stages of the disease are possible through a sensitive technique developed at the Pottenger Clinic.

The patient who scatters the "rare" tuberculosis germs cannot be taken out of society, Dr. Myers stated. He is physically well, able to walk from one to five miles, and can carry on his regular work.

How dangerous his rare germs may be no one knows. His care in destroying the sputum, conditions of light and ventilation in his home and work place and the resistance of his associates to tuberculosis may make these "rare" germs more or less dangerous.

Vaccination should not take the place of other TB-fighting measures, Dr. Pottenger said. Active cases of tuberculosis should be sought out and given a chance to get well. TB should also be fought, he advises, by "clearing the slums in which most of our tuberculosis is found; teaching people how to live and what to eat, and furnishing food at least to children when the bread-winner is ill, so that resistance is kept high."

An argument for TB vaccination can even be found, Dr. Pottenger pointed out, in the Lubeck disaster. In that small German town 252 children under 10 days old were each given 1,200,000,000 living virulent human TB germs by mistake for BCG, the anti-TB vaccine made from germs so weakened they have lost their power to cause the disease. According to general opinion, all these babies should have died, Dr. Pottenger stated. Instead, 175 were living and well four years later. All were infected but almost three-fourths (70%) had developed sufficient resistance to prevent the spread of the disease.

Countering this, Dr. Myers quoted figures showing BCG vaccination has not produced anything like as good results in reducing TB death rates as sound epidemiological methods.

In Denmark, Norway and Sweden which have had 20 years of uninterrupted vaccination against TB, the disease in 1944 was killing people at the rate of 70 per 100,000 population, according to a Norwegian report. The same year it killed only 41 out of every 100,000 population in the United States, where some of the greatest centers of congested population in the world exist, and where millions of Negroes, Mexicans and others with high tuberculosis mortality live.

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MEDICINE

Old as Well as Young Helped by Cancer Surgery

➤ OLD people with cancer can be helped by surgical operations as well as young people. Their age is not a bar to good surgery, Dr. J. J. Morton of the University of Rochester, N. Y., School of Medicine declared at the International Cancer Congress.

Growth processes in old people are slowed and so the cancer also is slowed in its growth, Dr. Morton pointed out. This means that it may not take as radical and big an operation to remove a cancer in an old person as it does in a young one.

Dr. Morton told the story of an 80-year-old carpenter to illustrate his point. The carpenter had a big cancer in his stomach at the end where the intestines join the stomach. The carpenter's doctor took a hopeless view, saying "he's too old for an operation and the cancer is too big to remove."

But Dr. Morton was hopeful. He operated on the man, removing all the stomach except a small piece at the top. He also removed a big piece of the intestine that was involved in the cancer, and joined the remaining stomach to the remaining intestine.

Two weeks later this 80-year-old carpenter was out of the hospital, and he has been back at work and well for the past year since the operation.

Dr. Morton operates on 70- and 80-year-olds all the time. So do other good surgeons. The surgery must be delicate and the patient must not be allowed to bleed much. But the patient's age is no barrier.

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MEDICINE

Flyless City Gets Polio

Caldwell, Idaho, which wiped out its flies believed to transmit polio, had a recent outbreak of the disease. May provide answer to an unsolved question.

► TRAGIC outbreak of infantile paralysis in Caldwell, Idaho, has given a new answer to one of the unsolved questions about polio.

The question is: Do flies transmit infantile paralysis to human beings?

This community, like others throughout Idaho, has waged successful war on flies. A voluntary campaign directed by local and state authorities has used DDT to wipe out common houseflies, blowflies, cowlies, mosquitoes and earwigs—the latter a cockroach-like insect species assuming pest proportions in this region.

"We have no flies here," residents of Caldwell proudly tell visitors.

Scientists back this boast. They believe flies have been wiped out as a menace to health.

Yet two persons are dead, and new cases of polio in recent weeks have brought the total number of cases to 52 since July 10 in the area of this rural community of 8,700 persons.

This gives medical science the record of a major outbreak in a fly-free community.

"We have not considered flies a factor in the epidemic at Caldwell," State Health Officer L. J. Peterson states.

He adds that other approaches have also failed thus far. The outbreak came in a clean, sanitary area, in sharp contrast to conditions found in many past polio epidemics elsewhere.

A scientific report on the epidemic is being prepared by Dr. A. G. Gillum of the University of Michigan and Dr. A. J. Steigman of the University of Cincinnati under grants from the National Foundation for Infantile Paralysis. Now back in their laboratories, these scientists will conduct blood tests and other experiments with specimens collected in Caldwell. This work, requiring many months, may shed new light on this area's outbreak of polio.

When the scientists made a routine check on the fly population they were

amazed at how few could be found. Their report may help clear the fly as a polio carrier.

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BIOCHEMISTRY

Vegetable Diet Found For Streptomycin Mold

► YOU can look for a price cut before long in streptomycin, the mold chemical that your doctor may prescribe for you if you get tularemia (rabbit fever), tuberculosis, influenzal meningitis and some kidney, bladder and eye infections.

The price cut is expected because the mold that produces streptomycin is going on a low-cost diet. Like many humans this winter, the mold will be fed soybeans instead of meat for its protein.

Discovery of a soybean nutrient for use instead of a meat extract in streptomycin production was made by scientists at the A. E. Staley Company in Decatur, Ill.

How far the basic \$5 price for one-thirtieth of an ounce (one gram) can be cut is not known yet. But the new nutrient's cost to streptomycin producers is about one-tenth that of nutrients formerly used.

The new nutrient not only costs less but increases the yield of streptomycin. It is hoped that the increase in yield will be 100%, though the Staley Company says it is not yet practicable to specify even the approximate extent to which the yield may be increased.

More and cheaper streptomycin may even help bring down the price of human food. The mold chemical has been found effective, experimentally, against a number of serious diseases which annually inflict enormous losses in livestock and poultry. With the limited amount of streptomycin available heretofore, most of it has gone for treatment of human ailments. But with more of it available, veterinarians are expected to use large quantities.

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Cattle not worried by flies produce more beef; cattle sprayed with DDT are practically fly-free.

A red sky in the morning does not always mean that bad weather will follow.

Ground squirrels are the best known and most injurious rodents in California; they destroy crops, damage irrigation ditches, and carry disease.



NEW DIET—The two little piles show the new cheap meatless diet for raising the mold of streptomycin. The larger pile shows the soybean meal from which the new nutrient is made, and the smaller one shows the quantity of nutrient that can be made from it.

PLANT-PHYSIOLOGY

Bigger, Better Pineapples Through Use of Hormone

► **BIGGER** and better pineapples through the use of plant hormones are the prospect offered in patent 2,428,335, by Dr. F. P. Mehrlich, plant physiologist with the Hawaiian Pineapple Company, Ltd., of Honolulu.

Properly timed application to pineapple plants of a suitable dilution of beta naphthoxy acetic acid or other synthetic growth-controlling substance, he says, results in a month's delay in fruit ripening, during which time the pineapple increases in weight by a pound or more. It also strengthens the stalk on which the pineapple is borne, and toughens the fruit's alligator-like hide, thereby decreasing damage in packing and shipping.

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ENGINEERING

No Atomic Power Electricity For at Least 20 Years

► **THE NATION'S** electric power industry officials are not worried about competition from atomic power for at least 20 years, an industry leader told Science Service.

Col. H. S. Bennion, a retired Army officer who is now managing director of the Edison Electric Institute, predicted that when atomic energy is harnessed for industrial use, giant new steam electric plants may use energy released from atoms to generate millions of kilowatts.

Smallest atomic-energy electric station will be on the order of the biggest stations in the world today in electric output, Col. Bennion predicted. But the men who are now planning power supplies for as far as 20 years in the future believe that atomic power, either to produce or replace electricity, is decades away, he declared.

"Best estimate we have is that there will be no atomic energy for electric power in the next 20 years," Col. Bennion stated.

Atomic energy power stations would pose many problems. They would have to be shielded to protect workers. A "poisoning" effect of atomic energy might make a unit unfit for use. Location of such a plant, and the supply and perhaps the allocation of fissionable materials are problems which must be solved before we can undertake to pro-

duce electricity with atomic energy, Col. Bennion explained.

When you flick a light switch in 1967, electric "juice" generated by today's type of steam or water power units will be flowing into the bulb, the industry spokesman forecast.

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CHEMISTRY

Metal-Strengthened Trees Damaged Less by Frost

► **TREES** internally strengthened with metal are not necessarily results of successful operations by tree surgeons; they are more often nutritional successes. J. F. Wischhusen of the Manganese Research and Development Foundation told the New York meeting of the American Chemical Society of some strange effects obtained by feeding fruit trees with the proper combinations of the so-called trace elements. Trees receiving manganese, cobalt, copper and iodine showed relatively little damage from frost. Trees deficient in manganese, copper, zinc and magnesium lost almost all their leaves and much of their fruit, and many of them showed severe limb splitting.

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METEOROLOGY-AERONAUTICS

Balloons to Report on Weather 18 Miles Up

► **SPECIAL** balloons now under development are expected to carry scientific instruments to an 18-mile height, the Navy revealed. The balloons will carry no crews. They will be made of a plastic material, and will be filled with helium gas.

Progress in the development of the balloons is reported by General Mills Aeronautical Research Laboratory, Minneapolis, where the work is being carried on for the Navy. Each is designed to carry 70 pounds of instruments, but in clusters of two or more will carry a greater weight.

The first flights will be conducted near Minneapolis, and possibly at the Naval Air Station, Lakehurst, N. J. The instruments will include various types for the detection of weather conditions, automatically reporting them to ground stations by radio. Other instruments will be cloud chambers for cosmic-ray investigations, neutron and proton counters, and various upper atmosphere research devices.

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IN SCIENCE

ASTRONOMY

Siamese Twin Stars Whirl in Contact

► **A PAIR** of Siamese twin stars, revolving around each other so close together that they are in actual physical contact, was reported to the American Astronomical Society by Dr. Olin J. Eggen of the University of Wisconsin's Washburn Observatory.

These peculiar stars eclipse each other periodically as they rapidly revolve. They are part of a double star system known as 44i Bootis. In a period of 219.5 years they together revolve around another star $4\frac{1}{2}$ billion miles away from them.

Contrary to what might be expected of two stars so close together, one of the eclipsing pair is more than twice the mass of the other. The smallest one is so faint that the only reason its spectrum is seen is that, because of the contact of the two stars, its light is reinforced by reflection from the brighter star.

The period in which the two stars revolve is less than one third of a day, but this appears to be increasing at the present time. Brightness changes are very rapid because of the eclipsing effect, and a photoelectric photometer has been used to follow them accurately.

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CHEMISTRY

Cheap Raw Materials Used To Make Synthetic Gas

► **LOW-GRADE** coal and lignite can be used as raw materials for synthetic gasoline without making use of costly pure oxygen, V. F. Parry and associates of the U.S. Bureau of Mines told the American Chemical Society meeting in New York. In their process, a double-walled retort is used, with the coal or lignite dumped into the space between inner and outer walls and treated with steam as it slides down. Retort temperature is raised to 1,900 degrees Centigrade. The steam and hot coal react to form the mixture of hydrogen and carbon monoxide, known as synthesis gas, which is the basis of the standard process for making synthetic gasoline originally developed in Germany.

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CE FIELDS

BIOLOGY

Black Widow Spider Lays Eggs Upside Down

See Front Cover

► UPSIDE DOWN the black widow spider lays her eggs and protects them in a ball of white silky web. The photographs shown on the front cover of this week's SCIENCE NEWS LETTER were taken by Kenneth L. Middleham and were among the many beautiful pictures shown at the International Exhibit of Biological Photography in Rochester, N. Y., sponsored by Biological Photographic Association.

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MEDICINE

Sulfa, Salt and Plasma 'Complete Cure' for Cholera

► CHOLERA, now epidemic in Egypt, can be both cured and prevented by modern medical methods.

Use of sulfadiazine, blood plasma and salt solution to produce a "complete cure" was developed by U. S. Navy doctors during an epidemic in India in 1945.

First reported in Science Service dispatches and later in a Naval Medical Bulletin article, this treatment can assure the recovery of every cholera victim, Comdr. Julius M. Amberson found.

This new treatment undoubtedly will be used in Egypt as soon as it is realized that it is effective.

The sulfa drug attacks the comma-shaped cholera germs, while the plasma and salt solution restore the fluid lost through the diarrhea and vomiting of the disease and help keep the blood circulating adequately.

DDT might help check Egypt's epidemic, because flies can carry cholera germs from the body wastes of patients to food and water.

The Egyptians themselves can do much to check the further spread of cholera in their land while waiting for the plane-borne anti-cholera vaccine from this country to arrive and be distributed. Here are a few simple rules, good wherever a cholera epidemic breaks out:

1. Boil all water used for drinking, brushing teeth, washing dishes.
2. If you can't boil it, chlorinate it thoroughly.
3. Don't eat uncooked food of any description.
4. If you use ice in beverages, be sure it is made from boiled or chlorinated water.
5. Destroy all body wastes of cholera patients.
6. Wash your hands frequently and thoroughly, especially before eating and handling food.

Science News Letter, October 11, 1947

PALEONTOLOGY

New-Found Fossil Skeleton May Help Solve Old Riddle

► DID the "conies" mentioned by David in Psalm 104, and by his son Solomon in Proverbs 30, have ancestors 60 million years ago?

A recently discovered fossil skeleton from this country may help to answer this question, which has been a moot point among paleontologists for a long time. The skeleton is of an extinct mammal named Meniscotherium, and it is chief prize brought back from a summer's work in New Mexico by an expedition under the direction of Dr. George Gaylord Simpson of the American Museum of Natural History.

Because the new-found skeleton is nearly complete, it may solve the riddle of the possible kinship between ancient Meniscotherium and the modern hyraxes, which is the more exact zoological name for the Biblical "conies". Earlier specimens, which raised the question, are too fragmentary to answer it.

Meniscotherium was a long-bodied, long-tailed, short-legged creature from the lower Eocene, very early in the Age of Mammals. It was small—not over the size of a fox-terrier.

Even older are the fossils brought back by Dr. Simpson's colleague, Dr. Edwin H. Colbert. They are specimens of some of the earliest dinosaurs, dating back about 200 million years. They were not large but they were fierce, and their descendants 100 million years later were the formidable flesh-eating tyrannosaurs. First clue to a find of a dozen complete skeletons was the spotting, by George Whitaker, Dr. Colbert's assistant, of a small claw lying on the ground near the foot of a cliff.

Science News Letter, October 11, 1947

ENTOMOLOGY

DDT Scores New Triumph Against Powder-Post Beetle

► DDT has scored another triumph in the fight against insect pests, this time against the powder-post beetle that infests and damages bamboo wood, the prime structural material of the tropics.

Brushing the freshly harvested wood with a DDT-kerosene solution protects it from attack by the beetles, Harold K. Plank of the Federal Experiment Station at Mayaguez, Puerto Rico, reports. (*Science*, Oct. 3.)

Scarcity of eastern hemisphere bamboo because of the war and continued shipping difficulties makes protection of the western hemisphere bamboos, now available in commercial quantities, more than ever important.

Science News Letter, October 11, 1947

AGRICULTURE

First Modern Soil Survey Being Conducted in Japan

► JAPAN'S first modern soil survey is now being conducted by American scientists attached to the occupation forces, states Dr. C. L. W. Swanson of the Connecticut Agricultural Experiment Station. Dr. Swanson, as an Air Corps major, formerly headed research on soils and fertilizers on Gen. MacArthur's staff.

Better knowledge of Japanese soils is needed, he explains, to get maximum food yield out of the diminished Empire's limited arable acreage. Soil survey methods used by Japanese scientists in pre-war days resembled those formerly used in the United States but now considered obsolete.

Great quantities of fertilizer, both commercial and home-produced, were formerly used to get the maximum yield per acre out of Japanese fields. How Japan is to pay for such imports, especially of indispensable phosphates, is now a severe problem. Yet it must be done, if American exports of food to Japan are ever to cease without the country's becoming another famine land.

Despite the Jap farmer's reputation as a careful conserver of soil, some bad land practices have been found, Dr. Swanson declares. Some fields have been plowed up-and-down on the slopes, instead of being terraced, and their soil naturally has suffered badly from erosion.

Science News Letter, October 11, 1947

AERONAUTICS

Transonic Flying

When flying as fast as sound, planes will be bucking an air-grip on the wings that will hold the craft back and even might destroy it with crushing pressure.

By A. C. MONAHAN

► WHEN we fly faster than sound, we will be bucking and beating the grasp of an air-grip on the wings of the plane that holds the craft back and even might destroy it with its crushing pressure.

This is the so-called barrier to fast flying that is met when the speed of the plane approaches that of sound. The air-grip is two pressure waves, one on each surface of the wing. They extend upward, downward and backward in a wide V-formation with the wing at the apex. They are the so-called shock waves.

It is the elastic limit of the air that limits the speed of sound. The sound waves travel as fast as the elasticity permits. These sound waves are pressure waves. Air can accommodate itself to pressure changes just so fast and no faster. Sound travels by a series of concentric waves, leaving the vibrating object that gives off the sound, normally in every direction, with the forward wave on the outside of an imaginary sphere. Whatever gives off sound is in vibration.

The waves cause pressure as they force their way outward, causing a molecular vibration in the air. Air, however, has a definite limit in elasticity. This is what the pressure changes meet, and what limits the speed of the waves and therefore of sound.

Elasticity of Air

The elasticity of air varies with the temperature. The hotter it is, the greater the elasticity is. For this reason sound travels faster when the temperature is higher, and more slowly when the temperature is low. The speed of sound near the surface of the earth in average temperatures is about 760 miles an hour. Five miles above the earth where the temperature is around minus 67 degrees Fahrenheit, the speed of sound is approximately 660 miles an hour.

The velocity of an object flying through the air at the speed of sound is a variable because the speed of sound is a variable, depending upon the temperature. Speeds in the neighborhood of that of sound

are called transonic, and range from around 600 to 800 miles an hour. It is in this transonic range that the real barrier occurs. Speeds above the transonic are supersonic. Those below are subsonic.

Ordinary flying is all in the subsonic, but the Navy Douglas Skystreak that recently beat the world's speed record by traveling at 650.6 miles an hour was in the transonic. Pilotless rockets and guided missiles have traveled in the supersonic. No plane with a pilot aboard has as yet traveled with the speed of sound.

Several planes have been designed and built with this in view, but none as yet has been put to the supreme test. One of the first was the Army XS-1, built by Bell Aircraft and theoretically capable of 1700 miles an hour, as far as thrust is concerned, at an altitude of 80,000 feet. It is powered by rocket engines so that it can fly far above the air supply needed with conventional and jet-propelled engines.

The XS-1, as first of a series of research planes, represents only one con-

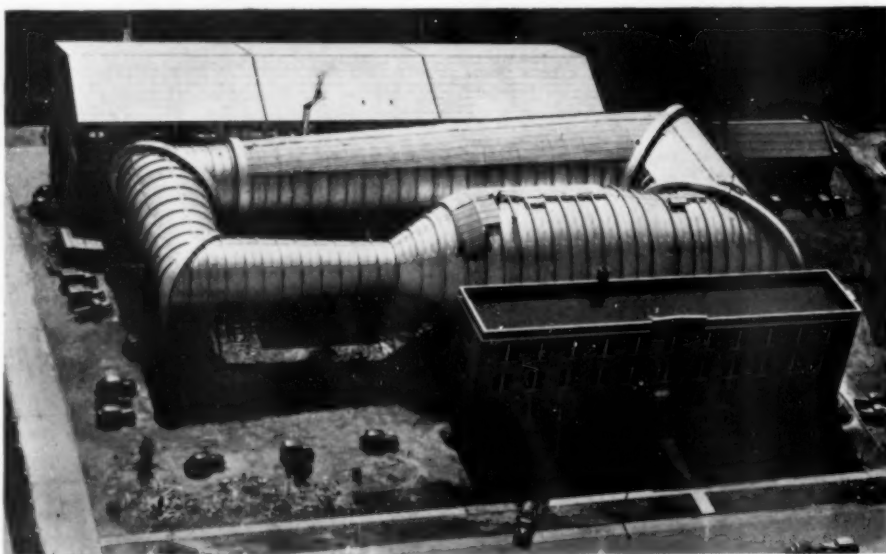
figuration, and does not by any means represent the latest data for supersonic flight. An improved plane, the XS-2, is under construction.

Then there is the Army Shooting Star, built by Lockheed, a version of which held the world's record before beaten by the Skystreak. There are others, including the English jet-propelled Gloster Meteor which has an official record of 606 miles an hour. One British plane which appears to have crushed and almost completely disintegrated in the air may have been flying at a transonic speed.

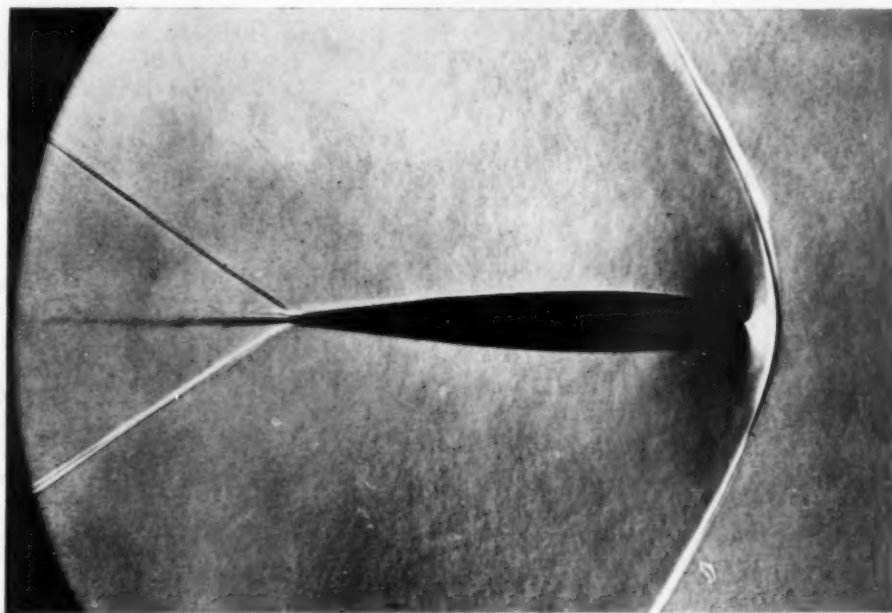
High Speed Planes

The authority in the United States, and perhaps in the world, on the design of planes to beat the speed of sound is the National Advisory Committee for Aeronautics. It is the government agency for fundamental studies in aeronautical science. The XS-1 with its straight wings, and the XS-2 with its sweeping backward wings, are designed according to its advice. In fact, this federal organization, called NACA for short, has had a role in the design of practically every plane produced in America since 1915.

Wind tunnels play an important part in the NACA program of studying aerodynamics. This science has to do with



WIND TUNNEL—This 19-foot tunnel of the NACA at Langley Field, Va., is not the largest or most modern of their pressure tunnels, but it shows the configuration of the supersonic speed equipment.



AIRFLOW PATTERN—This Schlieren photograph shows the bow wave formed when the blunt-edged wing is subjected to supersonic airflow. The wave is detached and stands out in front of the edge, instead of sweeping cleanly back as with the sharp-edged type.

the laws of motion of gases, especially atmosphere, under the influence of various forces, and the mechanical effects of such motion.

The NACA has been working for 20 years on high speed flow of air in its giant wind tunnels and otherwise. It has amassed a lot of information of the mechanics of compressible flow, part of which is incorporated in the new Army and Navy planes and others to beat the speed of sound.

These tunnels are both high-speed and supersonic tunnels, which range from high subsonic speeds of 700 miles an hour, to supersonic speeds up to 2,000 miles an hour. In addition, the NACA has developed methods to obtain data all across the transonic range, which so far can not be produced in wind tunnels.

Pressure Waves

As explained by an engineer of the NACA, an airplane moving through the air creates pressure waves in every direction. If the plane is standing still the pressure waves, perhaps from its propellers, would radiate in all directions in any given time. But when the plane is flying, it tends to overtake the waves spreading ahead and to leave behind those spreading rearward.

When a plane travels faster than sound, all pressure waves would actually be left behind because the source of the

disturbance is traveling faster than the pressure waves. When the plane travels as fast as sound, that is, in the transonic range, the pressure waves can no longer outrun the source, and hence pile up to form one continuous standing wave that keeps pace with the plane.

"Schlieren" Photographs

This shock wave is not just a theory. It can be seen by use of what are called "schlieren" photographs. These are made by sending parallel rays of light from a lens crosswise through a test tunnel in which a replica of a wing, or portion of a wing, is subjected to very high air speeds in the supersonic range.

The air in the wave is of different density from that in the other portions of the air flow and therefore refracts the light passing through it. The light leaving the tunnel is focused by a second lens. A sharp knife edge, placed at the focus of this second lens, acts as a "stop" for part of the light. The refracted ray, bent and no longer parallel to the others, does not converge on the focus. On a camera film it appears, in contrast to the general field, either as a light or dark spot.

Wing design is one of the most important factors in the development of transonic and supersonic planes. It is relatively easy to design wings or other airfoil or control surfaces for either the sub-

sonic or supersonic ranges. The great difficulty is development of airfoils and control surfaces that will operate in both kinds of airflow. This is the present barrier.

The forward edge of the ordinary wing is more or less blunt and it pushes some air on ahead of it as well as forcing an airflow over and under its surfaces. For supersonic speeds, the forward edges of wings will probably have to be knife-sharp so that they will cut the air cleanly. A subsonic airfoil can be moved at supersonic speeds, but it is only at a great sacrifice of power.

The action with the subsonic blunt wing edge in supersonic speeds shows clearly in a schlieren photograph. The pressure wave is detached and stands out in front of the rounded leading edge of the wing, instead of sweeping cleanly back from the leading edge as in the sharp-edged type. With this latter the air suffers no deflection until it actually strikes the airfoil. But with the blunt rounded leading edge, the air is backed up and slowed down before it ever reaches the airfoil itself.

The shock wave thus formed represents a greater degree of deceleration and compression, and hence resistance, than that which occurs in oblique shock waves. Directly in front of the wing the



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Do You Know?

Male and female *turkeys* become sexually mature when about seven months old.

Wheat accounted for over half the total tonnage of foods exported from the United States during 1946.

Fires seldom occur in clean houses, stores and shops where there are no combustible rubbish accumulations.

The hardness of *lead pencils* depends upon the amount of clay used in the graphite that constitutes the so-called lead.

Smoke belching from giant chimneys in certain factory cities creates a menace to flying due to decreased visibility above the cities.

Yarn and rope, made by weaving *coconut fiber*, have long been manufactured in Ceylon for domestic uses and export.

Most *cinnamon* used as a spice in America is the powdered bark of the cassia tree, which is more pungent than the bark of the true cinnamon tree.

There are today about 300 synthetic *detergents* or dirt removers, on the market, but only a few types promise to compete with soap in the household.

SAFETY IN THE LAB



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VISUAL SCIENCES

599-S SUFFERN, N. Y.

air is slowed down from supersonic to subsonic velocity, forming a second kind of shock wave, one which is perpendicular to the airflow. Both types of waves are called "bow waves" in this case. Because this second wave extends out beyond the area affected by the leading edge, it is swept backward by the supersonic speed and creates a large resistance.

Engines are available to propel planes at supersonic speeds, and the knife-sharp wing may go far in solving the super-

sonic problem. There is still the problem of a type of construction to withstand the high speeds and the shock pressures. The XS-1 and the Douglas Sky-streak in their test flights are gradually being operated at higher and higher speeds. They are both successful at the speeds at which tested, but what will happen when the attempt to get through the transonic barrier is made is as yet unknown.

Science News Letter, October 11, 1947

PHYSICS

Atomic Power Made Safe

Special precautions necessary including the elimination of all dust. Wastes can't be dumped but must be cleaned up to last drop.

► MAN CAN learn to live safely with atomic power installations, just as he has learned to live with high-pressure chemical retorts, high-voltage electrical machinery and high-temperature blast furnaces, predicted Dr. Karl Z. Morgan, director of the health physics division of the Monsanto Chemical Company's Clinton Laboratories at Oak Ridge at the New York meeting of the American Chemical Society.

This does not mean that old-timers in an atom-power plant can afford to become careless, any more than old hands in an electrical power plant can. They will just know the rules, stay within them, and be safe. Thus far, with all the atom-plant hands necessarily new hands, they are leaning over backwards in sticking to safety rules—and thus far not a single case of radiation damage has been reported from the plants at Hanford, Oak Ridge and Chicago.

Some new safety practices, peculiar to the handling of fissionable material, will have to be followed, the speaker warned. For example, whereas in most industries only excessive dust in the air is considered dangerous, in atomic plants any dust whatever must be regarded as a menace and eliminated.

Again, the easy-going custom that many industries have, of dumping liquid wastes down the drain and letting the fish in the river do the worrying about pollution, just won't do in plants where all wastes are radioactive. They will simply give a deadly metal plating to aforesaid drain, to the eventual undoing of some poor, unsuspecting plumber. Atomic industries of the future will have to clean up their own messes

to the last microscopic drop and crumb.

Greater safety in one of today's pre-atomic industries will result from a new phosphorus conversion method described before the meeting by three TVA chemists, Phillip Miller, R. A. Wilson and J. R. Tusson, of Wilson Dam, Ala. They have developed a new and better way of turning white phosphorus, which is dangerous to handle, into red phosphorus, which is safe.

Phosphorus changes from the white form to the red upon heating. Conventional practice has been to heat it in one-ton batches; but this process is uneven, conversion is incomplete and subsequent purification difficult. In their new form, white phosphorus is melted and the heating continued until the mass is partly converted. Then a blast of hot gas evaporates the remaining white phosphorus (which is recaptured and remelted), leaving highly purified, safe red phosphorus.

Science News Letter, October 11, 1947

YOUR

HAIR AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

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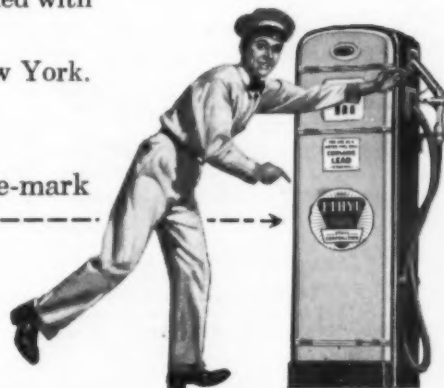


if gasoline were sold in cakes...

all the information you'd like to know about the ingredients it contained could be printed right on the wrapper. However, gasoline is usually piped directly into your car from a pump—so it isn't practical to label each gallon. Instead, oil companies put "Ethyl" trade-marks on their pumps to show you at a glance that their best gasoline contains "Ethyl" antiknock fluid. This important ingredient, which is made by the Ethyl Corporation, is mixed with gasoline to step up power and performance. To get more out of your car, buy *your* gasoline from pumps marked with the familiar yellow-and-black "Ethyl" emblem.

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Winter Company

► GERANIUMS, begonias, umbrella-plants, rubber-plants, oleanders, cacti—indeed, practically all of the most popular and easily raised houseplants—really represent a survival of the toughest. They have to be, to put up with indoor conditions which modern civilized man considers comfortable. Most of our living rooms and apartments are overheated

and under-ventilated, and practically without exception the air is kept too dry. We demand that our houseplants put up with the kind of atmosphere we like, and what we like, physiologically speaking, is desert air.

That is bad enough for the leafy tops of our plants. What their roots often have to put up with is worse still: too-small pots, soil with too much clay in it so that it puddles when over-watered (which it almost invariably is), and either so little of it that the plants half-starve or so much that water poured on top of the soil runs off and makes a muddy mess underneath.

Here are a few simple suggestions for making life more nearly bearable for your houseplants:

When you first pot them up, use flowerpots that look much too large for the plants as they are at the moment. Remember, they want to grow, and you want them to grow, and they will grow best if their roots have room, and enough soil to supply at least a minimum of mineral nutrients.

Put a piece of broken flowerpot, or a large pebble, over the hole in the bottom of the pot. Then cover the bottom of the

pot with an inch or so of coarse gravel. That is to make for better drainage, and to permit a little ventilation at the bottom of the pot. Roots of most plants need air, quite as much as do their leaves.

Then fill in partly with the soil you are going to use. It should be the best and richest soil your garden affords, with leaf-mold added. If it is a bit on the heavy side, a judicious admixture of fine sand is in order. Firm down gently, but don't pack it tight.

Set your plant on the soil surface, with its roots well spread, and fill in the rest of the soil around it. Don't skimp, but don't overfill. A half-inch below the pot brim is good. Firm the soil down, but again don't push too hard. Trim the oldest, lowermost leaves off, to reduce evaporation surface until the roots have recovered from the transplantation shock.

Set the pot in water, to about a third its height, let the soil absorb for a few minutes, then remove and let stand in the sink for a half-hour or so, to drain. Finally, set the pot on its saucer in the sunniest window you have. Don't fuss over your plants too much. Plants, like children, grow best when they are not being over-closely watched.

Science News Letter, October 11, 1947

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PHYSIOLOGY-CHEMISTRY

Study Bee for Long Life

► SOLOMON advised seekers after wisdom to go to the ant. Modern chemistry directs seekers after long life to go to her relative, the bee. Vitamins in royal jelly, the infant food on which the hive's queen-mother is reared, account for her extraordinarily long life expectancy—five years, as compared with the workers' three months—Dr. Thomas S. Gardner, industrial chemist of Nutley, N. J., told the American Chemical Society at its meeting in New York.

Four vitamins have been identified in royal jelly, Dr. Gardner stated. They are pantothenic acid, pyridoxin, sodium yeast nucleate and biotin. While each alone has more or less effect in prolonging insect life, their interactive effect when taken together seems to be much greater than the simple sum of their separate effects.

Chemists are still far from making Methusalehs out of ordinary short-lived mortals by feeding them queen-bee pabulum. Dr. Gardner has departed from the royal nursery in the hive only to the extent of feeding various combinations of the four royal-jelly vitamins to fruit-flies, those special pets of geneticists.

Greatest extension of the fruit-fly lifespan thus far achieved has been 46%.

Chemicals Make Soil Firm

► FLOOD-EROSION effects on soils can be prevented by radical chemical treatments that will give them greater clay-like tenacity and thereby increase their resistance to washing, it was suggested by Prof. Ernst A. Hauser of the Massachusetts Institute of Technology and Dr. D. S. LeBeau of the Midwest Rubber Reclaiming Company.

The treatments proposed would be aimed at the silica content of soils, which is their mineral backbone. The general idea is to increase the proportion of silica colloids, giving the soils firmer consistency and greater cohesiveness, or "stick-together power." The speakers also suggested the desirability of mixing fertilizers with clay before spreading, instead of applying them directly to the topsoil. This renders the nutrient salts more easily available to the plant roots, thereby making for greater economy in fertilizer use.

Science News Letter, October 11, 1947

Books of the Week

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ADVENTURES WITH PLASTICS — Louis V. Newkirk, Coleman Hewitt, and LaVada Zutter—*Heatb.* 275 p., illus., \$3.50. This book, written in simple, direct style, contains detailed instructions for making more than a hundred projects with plastics in school or home workshop.

CHEMICAL PROCESS PRINCIPLES: Pt. 3—Kinetics and Catalysis—Olaf A. Hougen and Kenneth M. Watson—*Wiley*, 1107 p., illus., \$4.50. College text treating applied chemical kinetics thoroughly and discussing the principles and applications of homogeneous catalytic and heterogeneous reactions.

THE CULTURAL APPROACH — Ruth E. McMurtry and Muna Lee—*Univ. of N. C.*, 280 p., \$3.50. A documented and factual survey of the governmental activities of ten nations toward improving mutual understanding of peoples through avenues of culture.

EDUCATION IN THE DOMINICAN REPUBLIC — Gladys L. Potter and Cameron D. Ebaugh—*U. S. Office of Education, Bulletin* 1947, No. 10, *Govt. Printing*, 34 p., paper, 15c. Another basic study on education which is one of a series prepared as a part of the program of cultural cooperation under auspices of U. S. Dept. of State.

ELEMENTS OF DEMOCRATIC GOVERNMENT — J. A. Corry—*Oxford Univ.*, 507 p., \$3.75. Revised edition of "Democratic Government and Politics," a political science text comparing the structure and working of government in U. S., Britain, and Canada with analysis of present-day problems.

AN INTRODUCTION TO SOIL MECHANICS — W. L. Lowe-Brown—*Pitman*, 2nd ed., 61 p., illus., \$1.75. A short descriptive survey of the subject written for the practicing engineer and omitting intricate mathematical formulae.

MEALS FOR MILLIONS — *N. Y. State Jt. Legislative Comm. on Nutrition*, Legis. Doc. (1947) #61—213 p., illus., free from: 94 Broadway, Newburgh, N. Y. The 5th and final report of the Committee advocating a nation-wide nutrition program and presenting viewpoints on nutrition by experts in various fields.

NUCLEONICS — *McGraw-Hill*, Monthly, \$15 per year. First issue of magazine which is consolidation of **ATOMIC POWER** and **ATOMIC ENGINEERING** and which is to cover technology for utilizing processes of radioactivity, nuclear disintegration, nuclear fission and nuclear synthesis.

PUBLIC HEALTH LAW — James A. Tobey—*Commonwealth Fund*, 3rd ed., 419 p., \$4.50. A revised edition of standard reference book which interprets the laws enacted for protection and promotion of public health together with facts regarding the administration and duties of health departments.

SURGERY OF THE AMBULATORY PATIENT — L. Kraeer Ferguson—*Lippincott*, 2nd ed.,

932 p., illus., \$10.00. A reference text based on actual experience which discusses the problems of supplies, anesthesia, operations, surgical lesions and methods of treatment including uses of sulfa and penicillin. Section on dislocations and fractures contributed by Louis Kaplan.

TEXTILE MICROSCOPY IN GERMANY—Office of QM General, Military Planning Div. Research & Development Br. Textile Series Report No. 13—*Textile Research Inst.*, 147 p., illus., \$5.50. The development of phase microscopy in Germany and its application to textile fiber research amply illustrated by photomicrographs.

UNESCO AND YOU — U. S. National Commission for UNESCO, Dept. of State Pub. #2904—*Govt. Printing*, 42 p., illus., 15c. Questions and answers relative to UNESCO and the part each individual should play in a program for national and international peace.

THE UNITED STATES AND NON-SELF-GOVERNING TERRITORIES—Dept. of State, Pub. 2812, U. S.—United Nations Information Series 18—*Govt. Printing*, 106 p., paper, 30c. A summary of the development of U. S. and United Nations policy in regard to dependent areas.

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ORDNANCE

Telescope on Gun Mount Records Flight of V-2's

► THE ART of war has married the science of astronomy, to bring forth a strange-looking instrument used in keeping accurate track of the guided missiles now under research at White Sands, in the New Mexico desert. It consists of a 16-inch reflecting telescope, almost identical, except for size, with the latest telescopes used for photographing distant stars and galaxies, set on the mount of a 90-millimeter anti-aircraft gun. The strange-looking hybrid was demonstrated at the Army Ordnance Proving Ground before the Army Ordnance Association.

It will be trained on V-2 rockets, and on the newer American missiles that will ultimately supersede them, and will record the whole course of their meteor-like flight on the film of a motion-picture camera that takes the place of the still-photograph plates used by astronomers. It is claimed that it will register changes of direction as small as a couple of inches at several score miles.

For the explosive war-heads that these and other missiles will carry, ordnance researchers are working on what they

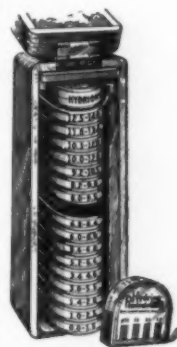
call controlled fragmentation. This means that they will burst in such a manner as to drive their whizzing fragments through the targets for which they are intended, and not scatter them at random all over the neighborhood. In a demonstration, a miniature war-head was exploded before a half-circle of seven targets. It put one fragment through the bull's eye of each target—and none anywhere else.

One ballistics instrument, intended for the measurement of bullet and shell velocities by letting them pass in succession over two photocells, was set up so that the visitors could measure the speed of baseballs pitched by themselves. Most of their pitches sped toward the plate at between 90 and 100 feet per second. An ordnance officer present stated that the instrument had been tried recently on Bob Feller. His speed is around 140 feet a second; but when sports writers call the speed of even this top-flight pitcher "bullet-like" they are speaking only in a figurative sense, for modern rifle bullets have muzzle velocities of 2,000 feet a second or higher.

Science News Letter, October 11, 1947

19

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If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 353. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

✿ **WINDOW WASHER'S** seat, which has just received a government patent, fits firmly over the window sill facing inward, with supporting straps from its rear to hooks half-way up on the outside of the window frame. A hinged backrest adds to the comfort of the user.

Science News Letter, October 11, 1947

✿ **DUAL PROJECTOR** for motion pictures, similar to those already in use except in dual construction, has two film trap members, two lens mounts, and two intermittent movements mounted one above the other, with the movements operating 180 degrees out of phase with each other. It gives continuous screen illumination.

Science News Letter, October 11, 1947

✿ **THYRATRON TUBE**, a vacuum tube used in electronics somewhat similar to radio tubes, operates both as a rectifier to change alternating to direct current and as an instantaneous electrical circuit breaker. The unique grid used in it allows normal rated current flow, yet blocks sudden destructive heavy overloads.

Science News Letter, October 11, 1947

✿ **BINDER GUIDE** for Singer sewing machines is an easy-to-use attachment that relieves the housewife from guiding the binder by hand. The device, shown in the picture, makes it easy to apply



two different widths of binding at the same time in one simple operation.

Science News Letter, October 11, 1947

✿ **ELECTRIC MOTORS** so small that two of them can be held in a thimble, manufactured in England, are expected to revolutionize many industries ranging from toy-making to electric razors. They employ an electromagnetic principle hitherto unknown in electric motor design.

Science News Letter, October 11, 1947

✿ **SYNTHETIC RUBBER** washer forms a waterproof seal between the heads of nails and the aluminum or other metal sheeting or roofing used as outside cover on a building. Neoprene was selected for this washer because it resists all forms of weathering, heat, sunlight, ice and rain.

Science News Letter, October 11, 1947

✿ **SUGAR DISPENSER** for table use, recently patented, is an inverted container with rounded top and a removable base from which a glass tube extends upright in the center. Holes in the tube permit a fixed amount of sugar to pour inside it when the device is upended. When righted, the sugar pours out the lower open end of the tube.

Science News Letter, October 11, 1947

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